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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,100	01/29/2002	Masahiro Kihara	360842008300	1199
25227	7590	03/01/2004	EXAMINER	
MORRISON & FOERSTER LLP 1650 TYSONS BOULEVARD SUITE 300 MCLEAN, VA 22102			MENON, KRISHNAN S	
			ART UNIT	PAPER NUMBER
			1723	

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/058,100	Applicant(s) KIHARA ET AL.	
	Examiner Krishnan S Menon	Art Unit 1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 18-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 27 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-17, 27 and 28 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-5, 11, 12, 16, 27 and 28 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by WO 01/14256 A1.

WO'256 teaches elements of the instant claims as follows:

Claim 1. (Amended) A method of desalinating water in a plurality of stages comprising membrane module units, wherein permeate water from a first stage membrane module unit is supplied to a second stage membrane module unit to obtain desalinated water therefrom, the method comprising (abstract, figure 1, page 2 line 17 – page 3 line 27):

processing at least a portion of a feed water having a total salt concentration of 3.0 to 4.8% by weight and a calcium ion concentration of 200 to 500 mg/l (page 2 line 30), wherein said at least a portion of the feed water is treated with the first stage membrane module unit to obtain the permeate water (page 2 lines 33- page 3 line 1) said permeate water being optionally mixed with an additional portion of the feed water to produce a second stage intake water (page 3 lines 1-6), the second stage intake water having a total salt concentration of about 55 to 90% of that of the feed

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water and a calcium ion concentration of about 95% or less of that of the feed water (page 7 lines 15-26 teach that the mix ratio is at least 5%, and Table 7 teaches that the total salt in the second stage intake can be less than 90% of the feed if the mix ratio is >60%; 60% is greater than 5%); and

supplying the second stage intake water to the second stage membrane module unit, thereby obtaining the desalinated water (page 3 lines 1-6 and 19-24).

Claim 27 and 28: the added limitation "second stage intake having total salt concentration within limit such that substantially no scales form on a membrane of the second stage": see page 3 lines 1-6 describing first stage water blended with feed water to second stage which includes RO; page 7 lines 15-26 which states at least 5% of the first stage permeate is mixed with the feed, and table 7 showing the actual concentrations of second stage feed based on the mix proportions. Page 2 lines 17-26 teaches that the hardness is substantially reduced. Table 7 and fig 6-9 teach the various blend ratios to achieve the "substantially no scale" condition. Applicant's no-scale condition (para 0090 of spec) is met at 20% NF water in sea water mix of table 7, the preferred mix as per the ref.

Claim 2: A method according to Claim 1, wherein the feed water has a sulphate ion concentration of 1500 to 3500 mg/l (ocean water: page 2 line 30) and the sulphate concentration is adjusted to 80% or less of that of the feed water by the first step (page 3 lines 19-24; page 4 lines 17-27; page 7 lines 15-26; Table 4; Table 7: salt concentrations in the feed water can be adjusted by varying the mixing proportions of untreated and softened water)

Claims 3-5: the % of water treated in the first stage and then mixed with untreated water: see page 3 lines 19-24; page 4 lines 17-27; page 7 lines 15-26; Table 7: salt concentrations in the feed water can be adjusted by varying the mixing proportions of untreated and softened water .

Claim 11. A method according to Claim 1, wherein a nanofiltration membrane unit is used for the first stage membrane module unit and a reverse osmosis membrane unit is used for the second stage membrane module unit (fig 1).

12. A method according to Claim 11, wherein the first stage nanofiltration membrane module unit has at least first and second membrane components at respective first and second sub-stages of the first stage, each said membrane component providing permeate water and concentrate water and wherein concentrate water from a first sub-stage nanofiltration membrane module component is supplied to a second sub-stage nanofiltration membrane module component (page 2 lines 1-11; page 8 lines 10-13).

16. A method according to any one of Claims 11, wherein a scale prevention agent is injected into the water supplied to the nanofiltration membrane module unit before performing nanofiltration (page 7 lines 27-31).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO'256.

WO'256 teaches all the limitations of claim 1. Instant claims add further limitations which WO is silent, as follows:

Claims 6 and 7 recites the recovery (amount of permeate expressed as % of total water supplied) of the permeate from the first stage. Page 8 lines 14-33 teaches use of operating pressure, etc., for the yield (or recovery). This is a result effective variable, and it would be obvious to one of ordinary skill in the art at the time of invention that the NF recovery could be optimized. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); In re Aller, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955).

Similarly, claims 8-10 recites recovery from the RO plant (overall recovery), which is also a result effective variable and within the skill of one of ordinary skill in the art (In re Boesch and Slaney...)

2. Claims 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO'256 in view of WO 99/16714

WO'256 teaches all the limitations of claim 11. Instant claims add further limitations on which WO'256 is silent, but WO'714 teaches as follows:

Claim 13. A method according to Claim 11, wherein the second stage reverse osmosis membrane module unit has at least first and second membrane components at respective first and second sub-stages of the second stage, each said membrane component providing permeate water and concentrate water and wherein concentrate water from a first sub-stage reverse osmosis membrane module component is supplied to a second sub-stage reverse osmosis membrane module component (see figure 2). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of WO'174 in the teaching of WO'256 because WO'256 does not give the arrangement of modules in second stage, and WO'256 is an improvement on WO'174 (page 7 lines 1-14).

17. A method according to Claim 1, wherein the feed water is filtered water processed with a microfiltration membrane or an ultrafiltration membrane (page 3 lines 15-20). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of WO'174 in the teaching of WO'256 because WO'256 does provide details of reducing SDI of feed water (in page 8 lines 8-10), and WO'256 is an improvement on WO'174 (page 7 lines 1-14).

3. Claims 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO'256 in view of WO 99/16714 as applied to claim 13 above and further in view of EP 0 709 130 A1

Claim 14. A method according to Claim 13, wherein the pressure of concentrate water from the first sub-stage reverse osmosis membrane module component is

boosted and the concentrate water then supplied to the second sub-stage reverse osmosis membrane module component to obtain desalinated water.

Claim 15. A method according to Claim 14, wherein, in a plurality of sub-stages at which reverse osmosis membrane module components are disposed, the relation between the operating pressure $P(n)$ of the first sub-stage reverse osmosis membrane module component and the operating pressure $(P_n + 1)$ of the second sub-stage reverse osmosis membrane module component is in a range given by the expression

$$1.15 \leq P(n + 1) / P(n) \leq 1.8.$$

WO'256 in view of WO'174 does not teach a booster pump as in claim 14 or the expression as in claim 15. EP teaches a booster pump in a multistage RO (Fig 1) and the expression (claim 13). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of EP'130 in the teaching of WO'256 in view of WO'174 to boost the pressure of concentrate to the second substage because it will provide the pressure optimization as taught by WO'256 (page 7 lines 12-14)

Response to Arguments

Applicant's arguments filed 1/28/04 have been fully considered but they are not persuasive.

Applicant's arguments are based on the '256 ref expressly or inherently failing to teach "the second stage intake water having a total salt concentration of 55 – 90% of that of the feed water" as recited in claim 1. In response: Table 7 shows the various proportions of the mix of sea water and the NF water for the second stage feed, in

which when the NF product in the feed is >60%, the condition is met. Page 7 lines 15-26 teach that the mix ratio is at least 5%, and >60% is also greater than 5%. Page 3 lines 1-6 teach that the second stage can be RO.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan Menon
Patent Examiner


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